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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/691,746

10/22/2003

Dimitry Shur

8640

1979

7590 11/25/2008  
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EXAMINER

JOHNSTON, PHILLIP A

ART UNIT

PAPER NUMBER

2881

MAIL DATE

DELIVERY MODE

11/25/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/691,746	<b>Applicant(s)</b> SHUR ET AL.	
	<b>Examiner</b> PHILLIP A. JOHNSTON	<b>Art Unit</b> 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

***Detailed Action***

1. This Office Action is submitted in response to the amendment filed 7-07-2008, wherein claims 1-18 are pending.

***Response to Arguments***

2. Applicant's arguments filed 7-07-2008 have been fully considered but they are not persuasive.

3. Applicant argues at page 1 of the remarks that the combinations of Chen, Bowes and Sawahata does not render the presently claimed invention obvious. For example, the resulting combination still would not yield the subject matter presently recited in claims 1, 6, 11 and 15.

4. The examiner disagrees.

The applicant is respectfully directed to the rejections below, where the combination of Chen and Bowes discloses all the structural limitations of claims 6 and 15; and the combination of Chen, Bowes, and Sawahata discloses all the structural limitations of claims 1 and 11.

5. Applicant also argues at page 1 of the remarks that, the combination of Chen, Bowes and Hiroi does not render the presently claimed invention obvious. First, the resulting combination still would not yield the subject matter presently recited in claims 1, 6, 11 and 15. Second, as to claims 5 and 10, it is not the surface of the wafer that is precharged, but instead the second feature (which is buried beneath at least the first layer).

6. The examiner disagrees.

The applicant is respectfully directed to Hiroi; Col. 12, line 62-67; and Col. 13, line 1-25 that describes charging pattern layers A8 and B9 located on a wafer, and does not disclose charging the wafer surface. In addition, Hiroi discloses irradiating both pattern layers A8 and B9 then differentiating between the charging effect of the lower layer relative to the charging effect of the upper layer by their image contrast values, which one of ordinary skill would interpret to mean that the layers above the wafer are charged as opposed to the wafer surface.

6. The rejection of claims 1-18 under 35 USC 103(a) are maintained.

7. All claims stand finally rejected.

***Claims Rejection – 35 U.S.C. 103***

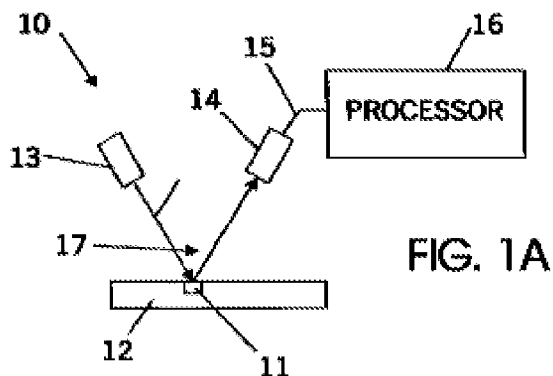
2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

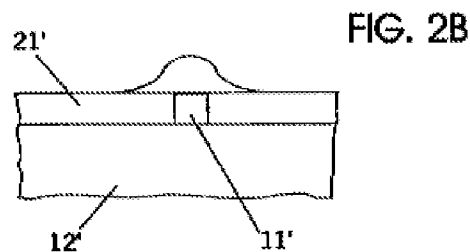
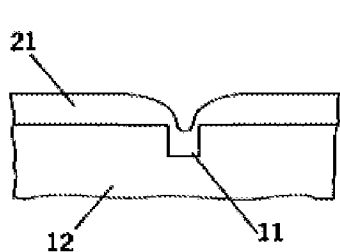
3. Claims 1, 3, 4, 6, 8, 9, 15, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 6,064,486 to Chen, in view of Bowes, USPN 6,778,275.

4. Regarding claim 15, 17, and 18, Chen discloses at Col. 5, line 3-10; an apparatus for measuring overlay error that includes the following;

(a) primary electron beam (13) shown in Figure 1A below, directed to an object 12, a scattered electron detector 14, and processor 16.



(b) an alignment mark having first (21) and second layers (12), where the second layer includes a second feature (11 or 11') buried under the first layer 21 or 21', where the second feature effects the shape of an area in the first layer as shown in Figures 2A and 2B below; and Col. 5, line 46-64.



Chen fails to teach an inspected object having a first feature formed on a first layer and a second feature formed on second layer, where the first and second features are not overlapping.

Bowes discloses an overlay measurement mark having a first layer 640 with feature 410 and second layer 630 with plural features, some of which are not overlapping (430, 450 etc.), as shown in Figure 6 below; Col. 11, line 62-67; and Col. 12, line 1-13.

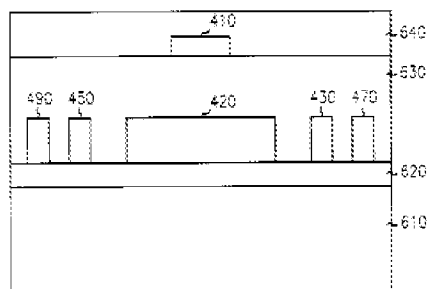


FIG. 6

Bowes modifies Chen to provide a multilayered alignment mark having patterns of different pitch located on different layers surrounding the box-in-box structure.

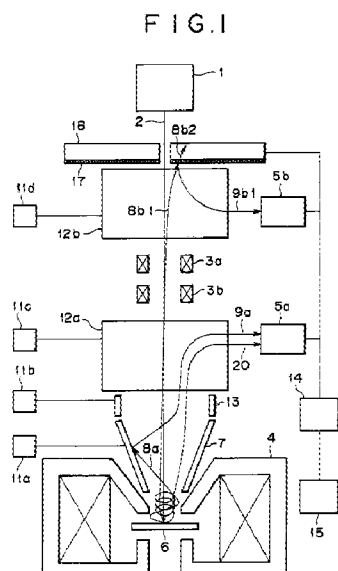
Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made that, Chen can be modified to use alignment features located on different layers in accordance with Bowes, to provide both horizontal and vertical registration measurements of patterned lines thereby improving verification of registration of overlying layers in semiconductor device manufacturing. Col. 1, line 36-50; and Col. 8, line 9-21.

5. Regarding claims 1, 3, 4, 6, 8, and 9, the combination of Chen and Bowes discloses the apparatus used in these method claims, as describe above regarding claims 15, 17, and 18.

6. Claims 2,7,11-14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 6,064,486 to Chen, in view of Bowes USPN 6,778,275, and in further view of Sawahata, U.S. Patent No. 6,501,077.

7. Regarding claims 2, 7, 11-14, and 16, the combination of Chen and Bowes fails to teach the detection of electrons reflected or scattered at small angles.

8. Sawahata discloses detecting reflected electron 8a generated at a low angle from the sample, using detector 5a. See Column 4, line 33-47; and Figure 1 below.



Therefore it would have been obvious to one of ordinary skill in the art that the overlay error detection apparatus and method of Chen and Bowes can be modified to use the detection of low angle reflected electrons in accordance with Sawahata to provide a scanning electron microscope where reflective electrons generated from a sample at a low angle can be detected efficiently. Col. 4, line 34-62.

9. Claims 5 and 10 are rejected under 103(a) as being unpatentable over USPN 6,064,486 to Chen, in view of Bowes USPN 6,778,275, and in further view of Hiroi, USPN 6,172,365.

10. Regarding claims 5 and 10 the combination of Chen and Bowes fails to teach the use of preliminary charging the second feature. However, Hiroi discloses pre-charging the sample surface to improve image resolution in an electron beam inspection apparatus. See Column 13, line 26-56.

Therefore it would have been obvious to one of ordinary skill in the art that the overlay error detection apparatus and method of Chen (486) can be modified to use the pre-charge method of Hiroi (365), to provide an electron beam inspection method, and apparatus, for reducing the charge-up phenomenon and obtaining a high-contrast signal representing a physical property by using secondary electrons or back-scattered electrons obtained from the object. Col. 1, line 52-60.

### ***Conclusion***

8. The Amendment filed on 7-07-2008 has been considered but is ineffective to overcome the references cited in the Office Action mailed 4-15-2008.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner




can normally be reached on Monday-Friday from 7:00 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor Robert Kim can be reached at (571) 272-2293. The fax phone number for the organization where the application or proceeding is assigned is 571 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ  
November 14, 2008

/ROBERT KIM/

Supervisory Patent Examiner, Art Unit 2881

<b><i>Application Number</i></b> 	<b>Application/Control No.</b>	<b>Applicant(s)/Patent under Reexamination</b>	
	10/691,746	SHUR ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	PHILLIP A. JOHNSTON	2881	